EUROPEAN COMMISSION
DIRECTION GENERALE POUR L'AIDE HUMANITAIRE & LA PROTECTION CIVILE
Regional Support Office for East and Southern Africa (Nairobi)

MISSION REPORT

Subject: **Kenya WASH RO Mission (Kalobeyei settlement – Turkana county)**
Auteur: **Jerome BURLOT (WASH Adviser/RSO Nairobi)**
Date: **16th September 2016**

Main partners and visited sites list:

Kalobeyei (accompanied by Jean Marc Jouineau ECHO TA Somali-refugees; Irene Bosire ECHO PA Somalia-refugees and Andrea Ferrero from EU delegation, agricultural and rural development sector; EUTF):

- UNHCR: Oscar Nabiswas (WASH officer)
- NRC: Fred Magumba (WASH officer)

Appendices list:

- ✓ 1: TOR- Drilling of boreholes in Kalobeyei Settlement;
- ✓ 2: TOR- Supply and delivery of pipes and fittings in New Refugee Camp - July 2016;
- ✓ 3: TOR- Supply and installation of submersible pumps and generators in Kalobeyei - July 2016;
- ✓ 4: TOR- Supply and installation of water facilities in new settlement - elevated steel tanks;
- ✓ 5: TOR- Supply and installation of water facilities in new settlement - pipes and fittings;
- ✓ 6: TOR- Hydrogeophysical survey Kalobeyei new site and Kakuma;
- ✓ 7: UNHCR Kalobeyei hydrorpt 06 10 2015 (hydrogeological report from Earth Water ltd.);
- ✓ 8: UNHCR Kalobeiyei Additional Final RPT (hydrogeological report from Earth Water ltd.).
- ✓ Hydrogeological report from Ellen Milnes, Neuchatel University

Table of Content

[1] International Federation of the Red Crescent and Red Cross society

EXECUTIVE SUMMARY

The mission took place 16th September 2016 and was accompanied by Irene Bosire (ECHO PO), JM Jouineau (ECHO TA) and Andrea Ferrero (EU Delegation agricultural and rural development expert).

Overall the monitoring of the Kalobeyei WASH project - including the ECHO funded part - has been made particularly difficult due to the lack of project documentation in general (technical, capitalization…). As a result it proved barely possible to monitor the project.

The main issue proved the lack of method and strategic thinking to carry out such an ambitious project, enhanced by the inappropriate capacities for implementation purposes on the ground (only 1 WASH officer). Consequently important delays have been noticed, related to the issues and gaps highlighted in the report.

As the implementation phase barely started, most of the monitoring assessment focused on the preparation work undertaken, which clearly appeared sub optimal and even not adapted to such type of project (see background section of this report). In such a context (dry lands of Turkana), such an approach might lead to harmful impact notably regarding the management of the water resources.

The monitoring mission has been based on a few documents sent by UNHCR, on the hydrogeological report from Neuchatel University and the discussion held on the field with the WASH officer.

The main findings from the visit are described there below:

- A clear lack of methodology and insufficient capacities on the ground in order to carry out, manage and supervise such a project:
    - no exhaustive feasibility study providing an overview and a comparison of the different technical options;
    - no existing water supply master (strategic) plan or technical orientation paper;
    - no detailed description and estimation of the needs as well as the resources (existing and missing data; initial assumptions; phasing of the project; extrapolations made, design parameter like safety factor…);
    - poor exploitation of existing hydrogeological survey and recommendations;
    - no clear WASH detailed work plan;
    - no overall design for the settlement (when ECHO action is supposed to be completed);
    - no clear timeline;
    - no monitoring plan designed for groundwater level, despite such a high water sensitive environment.
- Key recommendations from a high level expert have not been taken into account until recently, without explanations. For instance poor timely exploitation of existing hydrogeological survey and attached recommendation;
- A very poor level of strategic thinking and anticipation of problems/challenges/issues;
- A lack of capitalization, consolidation (of the work done) and formalization (details of project only known by WASH officer, with no back-up solution);

- No eco-technical analysis of the various technical options, and absence of cost analysis in general with regard to the initial costs as well as running costs of the system;
- Serious gaps in terms of contractor management, including supervision capacity and quality control (such as quality control of pipes and fittings upon delivery and after implementation);
- Serious concerns regarding the cost effectiveness of the project / value for money as well as its sustainability in the absence of any master document presenting directions taken, phasing out options, design assumptions …

In consequence:

- it proves impossible to ensure the relevancy of the project, its rationale and its logic (no perspective, no timeline presented), and therefore of technical orientations of the planned water infrastructures;
- it is not possible to evaluate the appropriate use of resources, cost efficiency and value for money, therefore issues can be expected;
- There are serious gaps in terms of accountability.

A clear set of recommendations have been presented throughout the report.

According the answer to the recommendation from UNHCR, I would recommend a technical audit for this project.

BACKGROUND

On 27-28th November 2014, the United Nations High Commissioner for Refugees (UNHCR) organized a roundtable on the integration of refugee and host community economies in Turkana.

The number of refugees in the Kakuma Refugee Camp in Turkana County has been increasing since the outbreak of conflict in the Republic of South Sudan in December 2013, as well as a steady flow of new arrivals from the Great Lakes region. This has resulted in a high level of congestion in the existing camp. To accommodate the increasing population, the Government of Turkana County has allocated about 1,500 hectares of land for a new refugee settlement near Kalobeyei township, situated about 30 km north-west of Kakuma town, along the Kitale- Lodwar-Lokichoggio-Juba Highway. About 40% of the land (close to 600 hectares) would be used for settlement of refugees, while the remaining 900 hectares would be allocated for economic activities, including agriculture.
There are about 10 host community settlements situated close to the new site. The host community villages have limited access to services. As the new site is situated on the pastoral/grazing land of the host communities, identifying mechanisms for equitable use of resources will be critical, to ensure peaceful co-existence between the two communities.
The United Nations High Commissioner for Refugees (UNHCR), the Department of Refugee Affairs (DRA) and the Turkana County Government have agreed to use this land to develop a refugee settlement that will promote self-reliance of both refugees and host communities, by providing them with better livelihood opportunities and enhanced service delivery.

On 29th July 2015, UNHCR and the World Bank (WB) organized a brainstorming forum to bring together government agencies, humanitarian and development actors, to creatively brainstorm on the

possibilities, towards developing a sustainable refugee settlement that enables: (i) better livelihood opportunities for refugees and host communities; and (ii) service delivery in a manner that is integrated with the local development planning. The brainstorming session was attended by the Deputy Governor of Turkana County H.E. Peter Ekai, the Member of Parliament for Turkana West, Hon. Daniel Nanok, the Acting Commissioner for Refugee Affairs, DRA, Mr. Edwin K. Ng'etich, as well as representatives from the Turkana County government, refugee and host community business persons, UN agencies, NGOs, development partners and civil society.

Activities under the Site Planning & Infrastructure Development Component include supporting collaboration between the various stakeholders in the design of a sustainable urban settlement, which will accommodate refugees and host communities. This requires the development of an integrated master plan for the settlement, which will be informed by the CIDP and other government plans. The primary goal of the master plan is to develop an urban center in Kalobeyei that would act as a catalyst for the development of surrounding villages and settlements. The Kalobeyei master plan should consider the adaptation of the best settlement typologies to ensure that the new site is developed as a settlement and related to the existing communities and habitat.
The development of the master plan will be informed by macro, meso, and micro analyses, to ensure that the settlement is designed taking into account the network of services, infrastructure and resources available in the settlement's vicinity.
The master plan development will be led by the national, county and local government entities to ensure that the master plan development is aligned to the existing development plans. Consultations with all key stakeholders, including development actors working on ICT, infrastructure, and services will take place in order to leverage ongoing investments and to ensure sustainable planning and development of the settlement. Community engagement in the development of the master plan would ensure ownership and peaceful co-existence between refugees and host communities.
Community engagement activities could include organizing awareness campaigns within the local communities about the benefits of the urban center that is being planned.

CAPACITY OF THE PARTNERS

On site we found only one UNHCR WASH officer (*NOA, lowest grade for national staff in UN system*) in charge to coordinate and implement the project. The same person is in charge of WASH in both Kakuma camp and Kalobyei settlement, where very different approaches are supposed to be implemented in terms of water access. In addition this project was supposed to be planned in advanced (before the relocation from Dadaab) and not to be completed in an emergency mode.

The existence of a strategic document with the main features, technical orientation and phasing of the project could have helped to justify and organize an emergency component in the project and to link it with the rest of the expected more longer term scope of work.

The technical capacity on ground is not sufficient based on the project workload and not adequate to the features/specificity of the project to ensure appropriate technical survey, design, implementation and sustainability. Most of the technical documents needed to design and implement such kind of project are missing.

When there is little technical documentation available, it is mainly constituted by terms of reference of some part of the work and hydrogeological report from various issuers with very different levels of relevancy. There is no strategic thinking and no clear method around this project, no technical orientations giving at least the outline of the approach followed and the tentative overall Water supply plan.

Even though the WASH officer in charge might be an adequate site engineer, he did appear to have neither sufficient background nor the proficiency in particular to design and also manage the whole project from survey to completion, and hand over stage. Indeed the WASH officer was barely able to explain the strategic approach of the project, the work plan, as well as certain aspects of the supervision and quality control of the contractor achievement. He should have been backed up by other team members.

Due to the lack of methodology and formalization of the approach, the only way for the ECHO team to try to understand the water supply strategy of Kalobeyei was based on questions to the only staff in charge, namely the WASH officer from UNHCR, and to some extent some WASH staff from NRC but only in relation to the distribution network. Such a situation can clearly raise problems in the implementation of the project, as all memory and information on the genesis/history and rationale/logic of the project is only known by the UNHCR WASH officer, with some pieces of information available at NRC level. There was no shared capitalization / back-up document which would ensure continuity and coherence in case the WASH officer is not present anymore. As a result, most of the monitoring and assessment of performance level in this report is based on verbal information from the WASH officer, as there has been no document provided to clearly understand the orientations of the project and then its relevancy, appropriateness and the use of resources.

On another level, the UNHCR WASH officer on the ground pretended to have received a lot of support from the regional office and from HQ, but from the regional office perspective, such a support was not welcome or even requested by the field. Such a misperception does not enhance a good level of confidence with information shared – verbally – by the partner.

MAIN FINDINGS AND DISCUSSIONS HELD / ISSUES TO FOLLOW UP:

Main findings:

Documentation:

Prior to the visit the following list of requested documents has been sent to UNHCR:

- ✓ Preliminary studies;
- ✓ Hydrogeological survey and map;
- ✓ Water supply master plan for the camp and integrated water resources management plan;
- ✓ Log profile of boreholes and pump tests;
- ✓ Topographic survey;

- ✓ Water quality test results / reports;
- ✓ Supervision reports (contractor supervision);
- ✓ Water table monitoring plan and results;
- ✓ Design, bill of quantities, lay out and technical scheme of the water infrastructure, map, technical specifications;
- ✓ Any document that the team will think relevant for the mission and understanding of the action led and local situation.

Only the following documents have been received so far (*28-09-2016*):

- ✓ TOR- Drilling of boreholes in Kalobeyei Settlement;
- ✓ TOR- Supply and delivery of pipes and fittings in New Refugee Camp - July 2016;
- ✓ TOR- Supply and installation of submersible pumps and generators in Kalobeyei - July 2016;
- ✓ TOR- Supply and installation of water facilities in new settlement - elevated steel tanks;
- ✓ TOR- Supply and installation of water facilities in new settlement - pipes and fittings;
- ✓ TOR- Hydrogeophysical survey Kalobeyei new site and Kakuma;
- ✓ UNHCR Kalobeyei hydrorpt 06 10 2015 (hydrogeological report from Earth Water ltd.);
- ✓ UNHCR Kalobeiyei Additional Final RPT (hydrogeological report from Earth Water ltd.).

Most of those TORs, except for hydrogeological survey and drilling of boreholes, are very basic documents mainly composed of BoQ[2] and have apparently been only produced recently (June/July). Whereas there are at least 3 hydrogeological reports about the ground water in Kakuma-Kalobeyei, only the less relevant one (*in terms of analysis and interpretation*) has been provided (*Earth Water Ltd*). During the visit, the missing documents, and notably the strategic and technical documents as well as eco-technical analyses, have been pointed out. During the debriefing, the Kalobeyei project manager pointed out that most of (if not all) the requested documents were actually available and promised to send them, but so far (*almost 2 weeks after the visit*) none has been received, therefore we do consider that they do not exist.
Consequently only documents previously listed up, plus the hydrogeological report (forward by SDC[3]) from high level expert from Neuchatel University, and the discussion at field level with the WASH officer have been taken into account in the present report.

As already mentioned, no reference or strategic documents related to the water supply of the Kalobeyei settlement have been provided. Among the missing operational documents we can highlight:

- ✓ no water supply master plan or detailed work plan, no water supply strategic document and no technical orientation paper;
- ✓ no feasibility study;
- ✓ no detailed work plan and clear timeline;

[2] Bill of quantities
[3] Swiss Development Cooperation

- ✓ no eco-technical comparative analysis of the various technical solutions, no cost analysis for the initial cost, as well for operating and maintenance costs;
- ✓ no design;
- ✓ very limited existing technical specifications except to some extent for the hydrogeological part of the work;
- ✓ no integrated water resource management plan; UNHCR mentioned it was planning to establish it, however the steering committee and the panel expert supposed to produce this document are yet to be identified;
- ✓ and no groundwater monitoring plan, whereas it is acknowledged by all actors that groundwater resources need to be monitored rigorously from the onset of the borehole commissioning to ensure no negative impact on the resources.

Indeed some boreholes have already shown some signs of depletion or/and increasing levels of water salinity, which constitute already significant warnings to closely monitor the groundwater table, borehole recovery time as well as conductivity, TDS and temperature parameters. Despite the fact that there are some ground water monitoring devices already installed in Kakuma, even one equipped with remote management device, there are no clear and formalized monitoring plans.

There are no clear expression of the needs breakdown considered at different stages of the project (mode of calculation, estimation of various consumption rates according to the use of water, public service, demographic assumptions…), no strategy in terms of water resources (estimation of the resources and their various appropriateness according to their potential, the feasibility to tap into those resources and the cost / impact analysis of the various potential set ups…).

Numerous very crucial technical recommendations in terms of water resources assessment / investigation, drilling strategy / method, monitoring and management of the project have been delivered 6 months to 1 year ago to the field team by high level expert. Explanations are required on why it took so long for such key recommendations to have been addressed.

For instance, the drilling of boreholes should have focused at first on Tarrach upper aquifer (alluvial). Special caution should have been taken to avoid mixing of alluvial and fractured groundwater (deep aquifer,) as of various qualities. Indeed there is a risk of mixing up both resources and therefore undermine the water quality of the upper aquifer. It took a long time for the WASH staff on the ground to adopt those recommendations and limit drilling to the upper aquifer in Tarrach groundwater resources. As the drilling should have been shallower than the ones catching the fractured aquifer in the weathered part of the bed rock, the cost could have been reduced.

All those points highlight the lack of accountability from this project.

Additional highlights on the main findings from the visit are being described below:

- ➢ There is no clear methodology being followed regarding the WASH aspect of the settlement construction, as all activities appear to be driven by an emergency mindset. For instance, numerous pipes (over 20 kms) have been ordered but the global design has not been finalized

yet (hydraulic calculations have only been performed for cluster 1 and the 3 operational boreholes). Such a methodology issue does affect the whole project design and implementation, leading to confusion, delays, the necessity to adapt to other sectors and stakeholders, lack of accountability and most likely negative impact with regard to cost effectiveness.

- There is no document describing perspectives in terms of water supply, presenting initial assumptions in order to understand the rational beyond the approach implemented by UNHCR. It is even less feasible to assess the appropriate use of resources and the cost efficiency / effectiveness of the action due to the lack of technical and capitalization documentation.

- With regard to technical survey and documentation, only the terms of reference of drilling boreholes and hydrogeological survey are relatively consistent, even though are still missing for the latter the way to control accuracy of vertical sounding measurement (for instance by perpendicular sounding) and the method of calibration of the geophysical measurement device. According the site engineer, they are now controlling the vertical sounding by cross checking with perpendicular sounding, but no documentation provided could reflect it. The WASH officer also mentioned that they did hydraulic calculation for the pressure line from the 3 boreholes drilled for Kalobeyei and for the water distribution network of cluster 1 (area considered to be hosting relocations from Dadaab and new arrivals in Kakuma). However, no document reflecting those outputs has been provided.

- WASH sector partners are being driven by others sectors as there is no clear and formalize plan on water supply. Despite the lack of data about some of the potential water resources, we could at least expect to have an overview of existing and missing data, assumptions and extrapolation being made, the technical framework and strategy, the phasing of the project even though all could be reviewed later on according to the findings of the continuous data collection.

- The partners mentioned a problem of capacity from the contractors, notably related to the water quality testing and the interpretation of geophysical survey (curves). Yet the capacity of supervision can be put in question given the HR involved in the technical part of this project.

- There is no plan on how the water supply system should be managed and what could be the different phases of community involvement in this activity. For the time being an INGO (NRC) does manage the infrastructure, but with no plan of progressively involve the users, targeting cost recovery, etc…

Main highlights / discussions held

UNHCR considers that part of the delay in the work achievement is due to the fact that they had to deal with new influx from South Sudan and to an already congested Kakuma camp. Indeed the first new refugees arrived in Kalobeyei a bit more than 3 months ago and major works were supposed to be achieved before. New influxes are already envisaged based on the planned Dadaab closure, but such a situation should not affect to this extent the planned development like activities to be implemented in Kalobeyei settlement.

This project should not be designed with an acute emergency mindset, but on the contrary should entail a clear strategic vision which might integrate an emergency component as contingency. There a bit of survey or technical investigation with regards to some elements of the project:

- pressure line between the 3 existing BH and the cluster 1 of the settlement and distribution network of the cluster 1;
- 3 positive BH have been drilled in Tarach river aquifer and 2 negative BH have been drilled in the Kalobeyei fractured aquifer.

The way to operate is more in wake with a reaction mode rather than a planning/anticipation mode.

Discussions with UNHCR and NRC WASH staff raised a number of concerns, as illustrated below:

⇒ The drilling report mentions a very high difference of pH (between 7,3 to 8,6), which in the context should not be possible in a short time lapse and especially between the completion of the development of the borehole and the pump test. Normally higher pH can be found when using for instance lime to consolidate the wall of the borehole during the drilling, but the development of the borehole is supposed to clean it from this material to ensure no impact on the quality of water. Then, the UNHCR WASH officer mentioned that they noticed a lot of problem with variation of water quality from one water test body to another. He mentioned that the problem could come from the calibration of the equipment used. In the meantime, those water tests have been paid and no measures have been put in place to handle this issue. The partners mentioned only that they are planning to buy their own water test equipment.

⇒ The partner mentioned they did not have the design of the water supply system yet, as they expected a consultant to be hired by NRC to do it. But even though they have not done all the site planning and the topographic survey, they already calculated and purchased the pipeline for the pressure line and the distribution network of cluster 1, which is also already implemented. Furthermore, some of the storage tanks have been already purchased without having all the required information to calculate their optimal sizes. When asked about the scope of work of the consultant company, they mentioned the selection of the specific fittings such as air valves and purges as well as the design of how to clear obstacles (drainage, road…) for the pressure line, which appears very limited. In addition, there is no strategic document to give orientation to the designer in terms of technical solution to be privileged. Cluster 1 of the camp is still being supplied by water trucking (for 3 months) as the pressure line has not been implemented and the borehole.

⇒ Despite clear recommendations in terms of hydrogeological survey (Neuchatel University), drilling completion, management of water resources and monitoring of groundwater table issued mid-2015 and May 2016 (*see report in annex*), it has taken a long time for UNHCR to take them into account with no justification for such a delay. Moreover such information was verbally provided by the WASH officer and there is no evidence that recommendations are actually being applied to date. Furthermore, there was still no clear formal groundwater

monitoring plan being implemented and no panel of experts / specialists to establish the integrated water resources management plan.

⇒ Based on the recommendation from the hydrogeological survey (Neuchatel), we can question the choice of UNHCR to use ECHO fund to drill a borehole in the Kalobeyei fractured aquifer or small wadi aquifer. Indeed those resources are considered to have low yield, potentially bad quality of water (high risk of salinity) and very complex to perform (low rate of positive drilled boreholes). Also the Tarrach river aquifer is quite well known and seems to be the most relevant resource (recommended by the hydrogeological report from Neuchatel and ISRAID) to cover a large portion of the needs, especially if the agricultural requirements are not taken into account (water needs for agriculture to be covered by surface water - rain and run off catchment). Ultimately the 2 boreholes drilled in Kalobeyei with ECHO funds proved negative and then UNHCR used others fund to finally drill in Tarrach river aquifer. The boreholes in Tarrach aquifers are the only ones in use today to supply cluster 1 of the settlement. They are quite productive and with good quality of water. It remains difficult to understand why the partner took so long to consider expert recommendations. Also the Kalobeyei potential aquifer should be investigated with larger campaign of drilling boreholes, as with ECHO fund only 4 were planned in an area where the rate of positive drilled boreholes was expected to be quite low.

⇒ The comparison of the hydrogeological survey interpretation and the log profile of the borehole (analysis of cutting sampling from the drilling) often showed very high variation, acknowledged by the UNHCR WASH officer. This situation can lead to issue in the equipment of the borehole, due to inappropriate positioning of the screen and sub optimal exploitation of the equipment, and thus a potential misuse of resources. Despite the identification of such problems, there was again a long reaction time from the management structure of the project. The WASH officer mentioned that given such problems of accuracy, the hydrogeological survey would now be performed using ERT method (more accurate as can provide the profile of the aquifer).

⇒ Within the framework of the project, boreholes are being drilled in cluster at a certain distance from each other, but the radius influence of the borehole in order to avoid that one borehole affects another (depletion of ground water level) is not known and has not been investigated by the partners, despite the fact that problems related to too high density have been already encountered. There is no assumption made regarding the strategic use of the various groundwater resources of the area as well as no economic analysis (for instance it would prove more coherent to use a minimum number of boreholes, prioritizing higher yield aquifer, meaning less pipeline to connect boreholes to the distribution system, less pumps and generators to purchase, to operate and to maintain…).

⇒ The existing main pressure line between the 3 boreholes in use and cluster 1 of the settlement has been designed (diameter of the pipe) based on the potential yield from the boreholes, which would only prove sufficient to cover domestic needs. Therefore additional sources of

water have to be identified for other purposes (meaning additional pipeline as well). The WASH officer mentioned that the diameter of the pipe has been fixed as they cannot drill new boreholes in this area, whilst the WASH officer does not know the radius influence[4] of the BH and the aquifer is supposed to be alluvial and continuous. If in the future more water could be extracted from a nearby area, a parallel pipeline will still be needed for connection purposes, which would not prove cost efficient.

⇒ The same questioning also concerns the various storing capacities already fixed without any calculation, just empirically, therefore most probably not fully cost effective. Overall given the low level of documentation, the type of assumptions made, the lack of strategic thinking, of survey, etc… the cost estimate of the project is questionable.

Bearing in mind all those issues, the incoherence and absence of technical documentation, it is not possible to only rely on verbal explanations provided by the WASH officer about the project, especially as such explanations do not reflect the overall strategy and main implementation modalities of the water access project for Kalobeyei. As a result, the level of accountability, the appropriate use of resources, the cost effectiveness and value for money of the operation are clearly at stake, as well as its sustainability.

Internally, I would recommend a technical audit of this project.

RECOMMENDATIONS

- The partner should produce a clear timeline to address the recommendations of this report.

- A clear methodology /strategy to carry out and implement this water project has to be very quickly defined and formalized through a detailed work plan with clear timeline.

- A clear and detailed monitoring plan has to be established with the different measurement to be performed, their frequency, the type of equipment to be used, the frequency of review and mode of data analyses, the distribution of the tasks with various staff responsible…

- A clear water supply master plan has to be designed, presenting the details of needs and resources at various stages (1st phase to cover 10 000pp; 2d phase after X years to supply 30 000 pp, plus 3 schools with X pupils, ….), the phasing of the project (the needs of infrastructure for the different phases / stages and how to upgrade the water supply system in a cost effective way), the feasibility and comparison (economic and technical) of the various technical options in terms of water network (the type of materials, water resources - pumping, water storages,

[4] Distance in which the drawback of a borehole could influence another borehole during pumping

mathematic/scientific tools used to perform the calculation…), the design of main parameters and the strategic initial assumptions, the technical orientations of the project, etc…

- The design of the water supply system has to completed asap including:
    - All design assumptions, the strategy to dimension the system (for instance which pipeline is going to be designed on peak flow or average flow; where the storing should be installed based on various diameter options to get an optimal hydraulic dimensioning and regulation of the system);
    - the details of the civil work dimensioning and technical specifications;
    - the hydraulic calculation to design the storages tank facilities as well as the various pipelines and the selection of the pumps;
    - the selection of the various hydraulic elements of the equipment based on technical and economic analysis;
    - the protection of the equipment (for instance the pumps, pipelines, type of fittings and protection equipment needed against cavitation or hydraulic hammer – to ensure sustainability);
    - the hydraulic regulation of the system (type and position of valves…);
    - the lay out;
    - the control quality mode (slum test, compression test and hardness test for concrete; proctor test for the compacting of the embedment of the pipeline; pump test and water quality testing for boreholes, pressure test for pipelines, perpendicular sounding for hydrogeological survey; etc…). The mode of control quality seems to be quite crucial in this environment given the level of proficiency of the contractor acknowledged by UNHCR WASH officer;
    - The design should include as well all topographic, lay down and hydraulic profiles; explain in details how to pass the obstacle on the trace of the pipeline; all necessary technical specifications…
    - All different elements of the design have to include cost analyses and comparative eco-technical analyses to ensure to define the best compromise between initial costs and O&M costs (running costs of the system). The LCC of the main equipment such as pumps and generators for instance should also be carried out at some point. The priority is to ensure the minimum running costs to make the system as affordable as possible to ensure its sustainability.

- The cost of operating and maintaining the whole water supply infrastructure should be estimated even roughly. In principle, the running costs of the system and to some extent of the LCC (Life Cycle Cost) should be integrated when designing the system. The system should be designed to ensure the minimum of level of running costs applicable. The price of water should be estimated as well at the different phases of the project.

- UNHCR should demonstrate that the use of the resources at least for ECHO funds is cost effective and that the value for money is optimal. A clear technical note should be produced with all the necessary figures, calculations and analyses necessary to ensure appropriate use of the resources.

- UNHCR should put a system in place to ensure that in future there is no that delay in addressing urgent and crucial recommendations from high level expert.

- The UNHCR technical staff to manage and coordinate the water aspect for both Kakuma and Kalobeyei should be enhanced; a proficient and experienced project manager should be appointed in addition to the existing WASH officer.

- Given the situation found on the ground in terms of lack of strategy, technical documentation, methodology to carry out the project, and the serious delay in project implementation, the support from the regional WASH structure and thus additional expertise should be required.

- It has been mentioned that a panel of experts is supposed to be appointed to carry out the task to develop the Integrated Water Resources Management Plan. The plan should be common for Kakuma and Kalobeyei given the link between resources (Tarrach river). The plan could be disaggregated by aquifer when the groundwater resources are isolated from each other's (?). The process should start immediately as too much as already been wasted on that notably. The strategic use / exploitation of the various types of groundwater resources should be estimated asap to ensure most possible appropriate design of the main supplying lines and boreholes to be implemented.

- A strategic plan to define the different options at different phases of the project to operate, maintain and manage the water supply system has to be developed asap. The plan should describe to which extent the system will have to be subsidized and how far the users could be involved in its management.

- Some of the delays in the technical survey / design of the water supply system have been justified by delays on the site planning. Thus the site planner and the WASH project manager should jointly handle this issue in order not to hamper the work progress. The link with the water project related to agricultural and livelihood purposes should also be enhanced to ensure coherent and harmonized approach.

- Special caution should be taken in defining the location of the rain and run off catchment area plan for the water project related to agricultural purposes to avoid negative impact on the groundwater abstract by the existing and planned boreholes.

- The partner should come up with an explanation on why there were such delays faced between the delivery of key recommendations from high level expert and the implementation phase, and demonstrate it has actually been implemented (as all information was exchanged verbally, with no documentation shared). Based on such recommendations, the choice of the locations to drill the ECHO funded boreholes should be justified.

- The level of accountability should be clearly enhanced.

- I would like also to remind that activity funded by ECHO have to be completed within the duration of the project funded. All equipment or materials purchase with ECHO fund has to be implemented within the duration of the project as well. Then, UNHCR should justify the completion of the ECHO funded part of the project within the project duration.